IN THE CLAIMS:

The following listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) A computer-implemented method for locating regions of a target image that match a template image with respect to color and pattern information, the method comprising:

performing a color matching search through the target image in order to find one or more candidate color match regions, wherein the candidate color match [[color]] regions match the template image with respect to color information, wherein said performing the color matching search through the target image comprises:

determining a plurality of sample regions at which to sample color information of the target image, wherein each sample region comprises a portion of the target image;

for each of the plurality of sample regions, determining a measure of difference between the color information of the sample region and color information of the template image;

for each of the plurality of sample regions, designating the sample region as a candidate color match region if the measure of difference between the color information of the sample region and the color information of the template image is smaller than a threshold value;

for each candidate color match region found in the color matching search, performing a pattern matching search of a proximal region proximal to the color match region in order to find one or more match regions in the target image;

wherein the one or more match regions found in the pattern matching search of each proximal region match the template image with respect to color and pattern information.

2. (Original) The method of claim 1, further comprising:

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for each match region found that matches the template image with respect to color and pattern information, displaying information on a graphical user interface indicating the location of the match region within the target image.

3. (Original) The method of claim 1, further comprising:

for each match region found that matches the template image with respect to color and pattern information, displaying information on a graphical user interface indicating a degree to which color and pattern information of the match region matches color and pattern information of the template image.

4. (Cancelled)

5. (Currently Amended) The method of claim [[4]]1, further comprising:

performing a color characterization analysis of the template image; and

for each of the plurality of sample regions, performing a color characterization analysis of the sample region;

wherein said determining the measure of difference between the color information of each sample region and the color information of the template image comprises comparing information obtained in the color characterization analysis of the sample region with information obtained in the color characterization analysis of the template image.

6. (Previously Presented) The method of claim 5,

wherein the template image and the target image each comprise a plurality of pixels;

wherein the color characterization analysis performed for the template image and the color characterization analysis performed for each of the plurality of sample regions comprise:

examining color information of at least a subset of pixels;

assigning each examined pixel to a color category that corresponds to a portion of a color space;

determining information indicative of the allocation of the examined pixels across color categories;

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wherein said comparing information obtained in the color characterization analysis of the sample region with information obtained in the color characterization analysis of the template image comprises comparing the allocations of the examined pixels across color categories for the sample region and the template image, respectively.

7. (Original) The method of claim 6,

wherein the color characterization analysis performed for the template image further comprises:

determining one or more dominant color categories, wherein the one or more dominant color categories are assigned a relatively larger proportion of examined pixels, with respect to other color categories of the color space;

wherein said comparing information obtained in the color characterization analysis of the sample region with information obtained in the color characterization analysis of the template image further comprises comparing the dominant color categories of the sample region and the template image, respectively.

8. (Previously Presented) The method of claim 6,

wherein the color characterization analysis performed for the template image comprises examining color information of each pixel in the template image;

wherein the color characterization analysis performed for each of the plurality of sample regions comprise examining color information of only a subset of the pixels in the sample region.

9. (Original) The method of claim 6,

wherein the color information of the template image and the color information of the target image comprise hue, saturation, and intensity (HSI) color information;

wherein said examining color information of at least a subset of pixels comprises examining HSI information of the at least a subset of pixels;

wherein said assigning each examined pixel to a color category that corresponds to a portion of a color space comprises assigning each examined pixel to a color category that corresponds to a portion of HSI color space.

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10. (Original) The method of claim 6, further comprising:

receiving user input specifying a desired color sensitivity level to use in said performing the color matching search;

wherein the user input determines a number of categories into which the color space is divided.

11. (Original) The method of claim 6,

wherein the color characterization analysis performed for each of the plurality of sample regions of the target image further comprises:

performing a smoothing operation after said assigning each examined pixel to a color category;

wherein the smoothing operation comprises:

for each respective color category of at least a subset of the possible color categories, re-distributing a portion of the pixels assigned to the respective color category to one or more neighboring color categories.

12. (Original) The method of claim 6,

wherein said assigning each examined pixel to a color category is performed in accordance with a fuzzy membership function.

13. (Currently Amended) The method of claim [[4]]1, wherein the target image comprises a plurality of pixels, the method further comprising:

determining a first step size to use in said determining the plurality of sample regions at which to sample the color information of the target image;

wherein said determining the plurality of sample regions comprises:

determining a plurality of regions of the target image at which to sample the color information of the target image, wherein the plurality of regions are each specified by windows into the target image, wherein windows are offset from each other by a number of pixels specified by the first step size.

14. (Original) The method of claim 1, further comprising:

receiving the target image;

wherein the target image is received from one of the group consisting of:

a memory medium, a hardware device, and a software application.

15. (Currently Amended) The method of claim 1, wherein the template image and the target image each comprise a plurality of pixels, the method further comprising:

characterizing pattern information of the template image, wherein the characterizing comprises:

sampling the template image to determine a first plurality of sample pixels, wherein the first plurality of sample pixels comprises a subset, but not all, of the pixels of the template image;

wherein said performing a pattern matching search of a ~~region surrounding each candidate color match region~~ proximal region proximal to each candidate color match region uses the first plurality of sample pixels.

16. (Currently Amended) The method of claim 1[[5]], wherein the characterizing further comprises:

characterizing pattern information of the template image, wherein said characterizing the pattern information comprises:

sampling the template image to determine a first plurality of sample pixels, wherein the first plurality of sample pixels comprises a subset, but not all, of the pixels of the template image; and

performing a local stability analysis around at least a subset of the first plurality of sample pixels, wherein said performing the local stability analysis determines a second plurality of sample pixels which have a desired degree of stability, wherein the second plurality of sample pixels comprises a subset, but not all, of the first plurality of sample pixels;

wherein said performing a pattern matching search of a ~~region surrounding each candidate color match region~~ proximal region proximal to each candidate color match region uses the second plurality of sample pixels.

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17. (Original) The method of claim 16,

wherein said performing the local stability analysis operates to ensure stability of each of the second plurality of sample pixels to spatial perturbations around the sample pixel.

18. (Original) The method of claim 16,

wherein said performing the local stability analysis around the at least a subset of the first plurality of sample pixels comprises:

for each sample pixel, finding a neighborhood around the sample pixel where a value of the sample pixel correlates highly with template image pixel values in the neighborhood.

19. (Currently Amended) The method of claim 16,

wherein said performing the local stability analysis determines a plurality of sets of sample pixels with differing stability neighborhood sizes; and

wherein said performing a pattern matching search of a ~~region surrounding each candidate color match region~~ proximal region proximal to each candidate color match region comprises performing a plurality of iterations of pattern matching using different ones of the sets of sample pixels.

20. (Original) The method of claim 19,

wherein said performing the plurality of iterations of pattern matching uses different step sizes for each of the different ones of the sets of sample pixels.

21. (Original) The method of claim 16,

wherein said performing the local stability analysis determines a plurality of sets of sample pixels with differing stability neighborhood sizes;

wherein said performing a pattern matching search of a proximal region proximal to each candidate color match region comprises performing a plurality of iterations of pattern matching using different ones of the sets of sample pixels in a coarse to fine manner.

22. (Original) The method of claim 21,

wherein said performing the plurality of iterations of pattern matching in the coarse to fine manner uses one or more of:

sets of sample pixels with successively smaller stability neighborhood sizes; and

sets of sample pixels with successively smaller step sizes.

23. (Original) The method of claim 16,

wherein each of the pixels in the template image are comprised of a plurality of components; and

wherein said sampling the template image comprises sampling the template image in one or more component planes of the plurality of components.

24. (Original) The method of claim 23,

wherein each of the pixels in the template image are comprised of hue, saturation, and intensity components; and

wherein said sampling the template image comprises sampling the template image in one or more of the hue, saturation, and intensity planes.

25. (Original) The method of claim 1, wherein each of the proximal regions surrounds its respective color match region.

26. (Currently Amended) A system for locating regions of a target image that match a template image with respect to color and pattern information, the system comprising:

a processor;

a memory medium coupled to the processor, wherein the memory medium stores color / pattern matching software;

wherein the processor is operable to execute the color / pattern matching software to:

perform a color matching search through the target image in order to find one or more candidate color match regions, wherein the candidate color match [[color]]

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regions match the template image with respect to color information, wherein, in performing the color matching search through the target image, the processor is operable to:

determine a plurality of sample regions at which to sample color information of the target image, wherein each sample region comprises a portion of the target image;

for each of the plurality of sample regions, determine a measure of difference between the color information of the sample region and color information of the template image;

for each of the plurality of sample regions, designate the sample region as a candidate color match region if the measure of difference between the color information of the sample region and the color information of the template image is smaller than a threshold value;

for each candidate color match region found in the color matching search, perform a pattern matching search of a proximal region proximal to the candidate color match region in order to find one or more match regions in the target image;

wherein the one or more match regions found in the pattern matching search of each proximal region match the template image with respect to color and pattern information.

27. (Original) The system of claim 26,

wherein the system further includes a display;

wherein, for each match region found that matches the template image with respect to color and pattern information, the display is operable to display information on a graphical user interface indicating the location of the match region within the target image.

28. (Original) The system of claim 26,

wherein the system further includes a display;

wherein, for each match region found that matches the template image with respect to color and pattern information, the display is operable display information on a graphical user interface indicating a degree to which color and pattern information of the region matches color and pattern information of the template image.

29. (Cancelled)

30. (Currently Amended) The system of claim [[29]]26, wherein the processor is further operable to:

　　perform a color characterization analysis of the template image;

　　for each of the plurality of sample regions, perform a color characterization analysis of the sample region;

　　wherein, in determining the measure of difference between the color information of each sample region and the color information of the template image, the processor is operable to compare information obtained in the color characterization analysis of the sample region with information obtained in the color characterization analysis of the template image.

31. (Previously Presented) The system of claim 30,

　　wherein the template image and the target image each comprise a plurality of pixels;

　　wherein, in performing the color characterization analysis for the template image and the color characterization analysis for each of the plurality of sample regions, the processor is operable to:

　　　　examine color information of at least a subset of pixels;

　　　　assign each examined pixel to a color category that corresponds to a portion of a color space; and

　　　　determine information indicative of the allocation of the examined pixels across color categories;

　　wherein, in comparing information obtained in the color characterization analysis of the sample region with information obtained in the color characterization analysis of the template image, the processor is operable to compare the allocations of the examined pixels across color categories for the sample region and the template image, respectively.

32. (Original) The system of claim 31,

wherein, in performing the color characterization analysis for the template image, the processor is operable to:

determine one or more dominant color categories, wherein the one or more dominant color categories are assigned a relatively larger proportion of examined pixels, with respect to other color categories of the color space;

wherein, in comparing information obtained in the color characterization analysis of the sample region with information obtained in the color characterization analysis of the template image, the processor is operable to compare the dominant color categories of the sample region and the template image, respectively.

33. (Previously Presented) The system of claim 31,

wherein, in performing the color characterization analysis for the template image, the processor is operable to examine color information of each pixel in the template image;

wherein, in performing the color characterization analysis for each of the plurality of sample regions, the processor is operable to examine color information of only a subset of the pixels in the sample region.

34. (Original) The system of claim 31,

wherein the processor is operable to assign each examined pixel to a color category in accordance with a fuzzy membership function.

35. (Currently Amended) The system of claim 26, wherein the template image and the target image each comprise a plurality of pixels;

wherein the processor is further operable to characterize pattern information of the template image, wherein, in characterizing the pattern information, the processor is operable to:

sample the template image to determine a first plurality of sample pixels, wherein the first plurality of sample pixels comprises a subset, but not all, of the pixels of the template image;

wherein, in performing ~~the processor performs~~ a pattern matching search of a ~~region surrounding each candidate color match region~~ proximal region proximal to each candidate

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color match region, the processor is operable to execute the color / pattern matching software to:

perform a pattern matching search of a proximal region proximal to each candidate color match region using the first plurality of sample pixels.

36. (Currently Amended) The system of claim [[35]]26,

wherein the template image and the target image each comprise a plurality of pixels;

wherein the processor is further operable to characterize pattern information of the template image, wherein, in characterizing the pattern information, the processor is further operable to:

sample the template image to determine a first plurality of sample pixels, wherein the first plurality of sample pixels comprises a subset, but not all, of the pixels of the template image; and

perform a local stability analysis around at least a subset of the first plurality of sample pixels, wherein said performing the local stability analysis determines a second plurality of sample pixels which have a desired degree of stability, wherein the second plurality of sample pixels comprises a subset, but not all, of the first plurality of sample pixels;

wherein, in performing the processor performs a pattern matching search of a region surrounding each candidate color match region proximal region proximal to each candidate color match region, the processor is operable to execute the color / pattern matching software to:

perform a pattern matching search of a proximal region proximal to each candidate color match region using the second plurality of sample pixels.

37. (Original) The system of claim 26,

wherein each of the pixels in the template image are comprised of a plurality of components; and

wherein the processor is operable to sample the template image in one or more component planes of the plurality of components.

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38. (Currently Amended) A memory medium comprising program instructions for locating regions of a target image that match a template image with respect to color and pattern information, wherein the program instructions are executable to implement:

performing a color matching search through the target image in order to find one or more candidate color match regions, wherein the candidate color match [[color]] regions match the template image with respect to color information, wherein said performing the color matching search through the target image comprises:

determining a plurality of sample regions at which to sample color information of the target image, wherein each sample region comprises a portion of the target image;

for each of the plurality of sample regions, determining a measure of difference between the color information of the sample region and color information of the template image; and

for each of the plurality of sample regions, designating the sample region as a candidate color match region if the measure of difference between the color information of the sample region and the color information of the template image is smaller than a threshold value;

for each candidate color match region found in the color matching search, performing a pattern matching search of a proximal region proximal to the color match region in order to find one or more match regions in the target image;

wherein the one or more match regions found in the pattern matching search of each proximal region match the template image with respect to color and pattern information.

39. (Original) The memory medium of claim 38, wherein the program instructions are further executable to implement:

for each match region found that matches the template image with respect to color and pattern information, displaying information on a graphical user interface indicating the location of the match region within the target image.

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40. (Original) The memory medium of claim 38, wherein the program instructions are further executable to implement:

for each match region found that matches the template image with respect to color and pattern information, displaying information on a graphical user interface indicating a degree to which color and pattern information of the match region matches color and pattern information of the template image.

41. (Cancelled)

42. (Currently Amended) The memory medium of claim [[41]]38, wherein the program instructions are further executable to implement:

performing a color characterization analysis of the template image;

for each of the plurality of sample regions, performing a color characterization analysis of the sample region;

wherein said determining the measure of difference between the color information of each sample region and the color information of the template image comprises comparing information obtained in the color characterization analysis of the sample region with information obtained in the color characterization analysis of the template image.

43. (Currently Amended) The memory medium of claim 42,

wherein the template image and the target image each comprise a plurality of pixels;

wherein the color characterization analysis performed for the template image and the color characterization analysis performed for each of the plurality of sample regions comprise:

examining color information of at least a subset of pixels;

assigning each examined pixel to a color category that corresponds to a portion of a color space;

determining information indicative of the allocation of the examined pixels across color categories;

wherein said comparing information obtained in the color characterization analysis of the sample region with information obtained in the color characterization analysis of the

template image comprises comparing the allocations of the examined pixels across color categories for the sample region and the template image, respectively.

44. (Currently Amended) A computer-implemented method for locating at least one region of a target image that matches a template image with respect to color and pattern information, wherein the at least one region of the target image comprises an instance of a rotated template image in the target image, the method comprising:

performing a color matching search through the target image in order to find one or more candidate color match regions, wherein the candidate color match [[color]] regions match the template image with respect to color information;

for each candidate color match region found in the color matching search, performing a pattern matching search of a proximal region proximal to the color match region in order to find one or more match regions in the target image;

wherein said performing the pattern matching search comprises:

sampling the template image along one or more rotationally invariant paths to produce one or more sets of sample pixels;

performing pattern matching using each of the one or more sets of sample pixels and the target image to determine one or more locations of the template image in the target image, wherein said pattern matching detects rotated versions of the template image in the target image;

wherein the one or more match regions found in the pattern matching search of each proximal region match the template image with respect to color and pattern information.

45. (Original) The method of claim 44, wherein said rotationally invariant paths comprise circular paths.

46. – 48. (Cancelled)

49. (New) A computer-implemented method for locating regions of a target image that match a template image with respect to color and pattern information, wherein the

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template image and the target image each comprise a plurality of pixels, the method comprising:

characterizing pattern information of the template image, wherein said characterizing the pattern information comprises:

sampling the template image to determine a first plurality of sample pixels, wherein the first plurality of sample pixels comprises a subset, but not all, of the pixels of the template image;

performing a local stability analysis around at least a subset of the first plurality of sample pixels, wherein said performing the local stability analysis determines a second plurality of sample pixels which have a desired degree of stability, wherein the second plurality of sample pixels comprises a subset, but not all, of the first plurality of sample pixels;

wherein the method further comprises:

performing a color matching search through the target image in order to find one or more candidate color match regions, wherein the candidate color match regions match the template image with respect to color information; and

for each candidate color match region found in the color matching search, performing a pattern matching search of a proximal region proximal to the candidate color match region in order to find one or more match regions in the target image, wherein the pattern matching search of each proximal region uses the second plurality of sample pixels;

wherein the one or more match regions found in the pattern matching search of each proximal region match the template image with respect to color and pattern information.

50. (New) The method of claim 1, wherein each of the proximal regions comprises and is greater than its respective color match region.

51. (New) A system for locating regions of a target image that match a template image with respect to color and pattern information, wherein the template image and the target image each comprise a plurality of pixels, the system comprising:

a processor;

a memory medium coupled to the processor, wherein the memory medium stores color / pattern matching software;

wherein the color / pattern matching software is executable by the processor to characterize pattern information of the template image, wherein said characterizing the pattern information of the template image comprises:

sampling the template image to determine a first plurality of sample pixels, wherein the first plurality of sample pixels comprises a subset, but not all, of the pixels of the template image; and

performing a local stability analysis around at least a subset of the first plurality of sample pixels, wherein said performing the local stability analysis determines a second plurality of sample pixels which have a desired degree of stability, wherein the second plurality of sample pixels comprises a subset, but not all, of the first plurality of sample pixels;

wherein the color / pattern matching software is further executable by the processor to:

perform a color matching search through the target image in order to find one or more candidate color match regions, wherein the candidate match regions match the template image with respect to color information; and

for each candidate color match region found in the color matching search, perform a pattern matching search of a proximal region proximal to the candidate color match region in order to find one or more match regions in the target image, wherein the pattern matching search of each proximal region uses the second plurality of sample pixels;

wherein the one or more match regions found in the pattern matching search of each proximal region match the template image with respect to color and pattern information.

52. (New) The system of claim 51, wherein each of the proximal regions comprises and is greater than its respective color match region.

53. (New) A memory medium comprising program instructions for locating regions of a target image that match a template image with respect to color and pattern information, wherein the program instructions are executable to implement:

characterizing pattern information of the template image, wherein said characterizing the pattern information comprises:

sampling the template image to determine a first plurality of sample pixels, wherein the first plurality of sample pixels comprises a subset, but not all, of the pixels of the template image;

performing a local stability analysis around at least a subset of the first plurality of sample pixels, wherein said performing the local stability analysis determines a second plurality of sample pixels which have a desired degree of stability, wherein the second plurality of sample pixels comprises a subset, but not all, of the first plurality of sample pixels;

wherein the program instructions are further executable to implement:

performing a color matching search through the target image in order to find one or more candidate color match regions, wherein the candidate color match regions match the template image with respect to color information; and

for each candidate color match region found in the color matching search, performing a pattern matching search of a proximal region proximal to the candidate color match region in order to find one or more match regions in the target image, wherein the pattern matching search of each proximal region uses the second plurality of sample pixels;

wherein the one or more match regions found in the pattern matching search of each proximal region match the template image with respect to color and pattern information.

54. (New) The memory medium of claim 53, wherein each of the proximal regions comprises and is greater than its respective color match region.

55. (New) The method of claim 1, wherein each of the proximal regions comprises and is greater than its respective color match region.

56. (New) The system of claim 26, wherein each of the proximal regions comprises and is greater than its respective color match region.

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57. (New) The memory medium of claim 38, wherein each of the proximal regions comprises and is greater than its respective color match region.